

A FIRST SPONTANEOUS RECORD OF *ACTINIDIA CHINENSIS* VAR. *DELICIOSA* (ACTINIDIACEAE) IN THE UNITED STATES FLORA

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ABSTRACT

Actinidia chinensis Planch. var. *deliciosa* (A. Chev.) A. Chev. (green kiwifruit) is here reported as new to the flora of Arkansas and the United States. Establishment of *A. chinensis* var. *deliciosa* at the Saline County site potentially occurred through the transport and subsequent introduction of one or more seeds to the site via a sewer pump station. Photographs of *Actinidia chinensis* var. *deliciosa*, along with a key to the three species of *Actinidia* currently known to occur outside of cultivation in the United States, are also included.

RESUMEN

Se cita aquí *Actinidia chinensis* Planch. var. *deliciosa* (A. Chev.) A. Chev. (kiwi verde) como nuevo para la flora de Arkansas y los Estados Unidos. El establecimiento de *A. chinensis* var. *deliciosa* en el condado de Saline County ocurrió potencialmente mediante el transporte e introducción subsecuente de una o más semillas a través de una depuradora. Se incluyen fotografías de *Actinidia chinensis* var. *deliciosa*, junto con una clave de las tres especies de *Actinidia* que se conocen actualmente fuera de cultivo en los Estados Unidos.

INTRODUCTION

In the United States flora, non-native plant species are continuously being documented and added, both at the regional and national levels (Whittemore 2004; Neves et al. 2009; Serviss 2009; Wunderlin et al. 2010; Peck & Serviss 2011). In some instances, subsequent to introduction, these species naturalize or occasionally even become invasive; therefore, it is extremely important to record first encounters with escaped populations and monitor new spontaneous occurrences of non-native species in order to evaluate their potential as invasive species (Neves et al. 2009; Yatskievych & Raveill 2001). Introduction of non-native plant species into the United States is often intentionally driven based on their potential as ornamentals or lucrative agronomic crops.

A case-in-point example would be the genus *Actinidia*. *Actinidia* is an Asiatic genus consisting of about 55 species of lianas, with its center of diversity in China (52 species, 44 of which are endemic) (Flora of China Editorial Committee 2007). Some species of *Actinidia* are important as ornamentals because of their showy and often colorful foliage and flowers, and a few species are important for their edible fruits, such as *A. arguta*, *A. chinensis*, and *A. kolomikta*. These represent the principle reasons why *Actinidia* species were introduced into the US.

Actinidia chinensis Planch. var. *deliciosa* (A. Chev.) A. Chev. (green kiwifruit, Chinese gooseberry) is the standard kiwi fruit of commerce and represents one of the few temperate fruit crop species to have been domesticated in the last 100 years (Ferguson 1999). The kiwifruit industry began in 1904 when seed collected from China were brought to New Zealand, and by 1970, the green kiwifruit had been developed into a production crop (Ferguson and Bollard 1990). At present, on an annual basis, over one million metric tons of kiwifruit are produced worldwide, most of which is grown in four countries: Italy, China, New Zealand, and Chile (World Kiwifruit Review 2009), and although only small amounts are produced commercially in the United States, the kiwifruit has become a popular commodity in this country (Ferguson 1999). *Actinidia chinensis* var. *deliciosa* has recently been recorded as spontaneous in a few European countries (Kasperek 2004; Essl & Stoehr 2006), so it is not surprising, based on its relative cold hardiness and seed viability, along with the popularity of its fruit as a food in this country (as it is in Europe), that *A. chinensis* var. *deliciosa* has also been documented outside of cultivation in the United States.

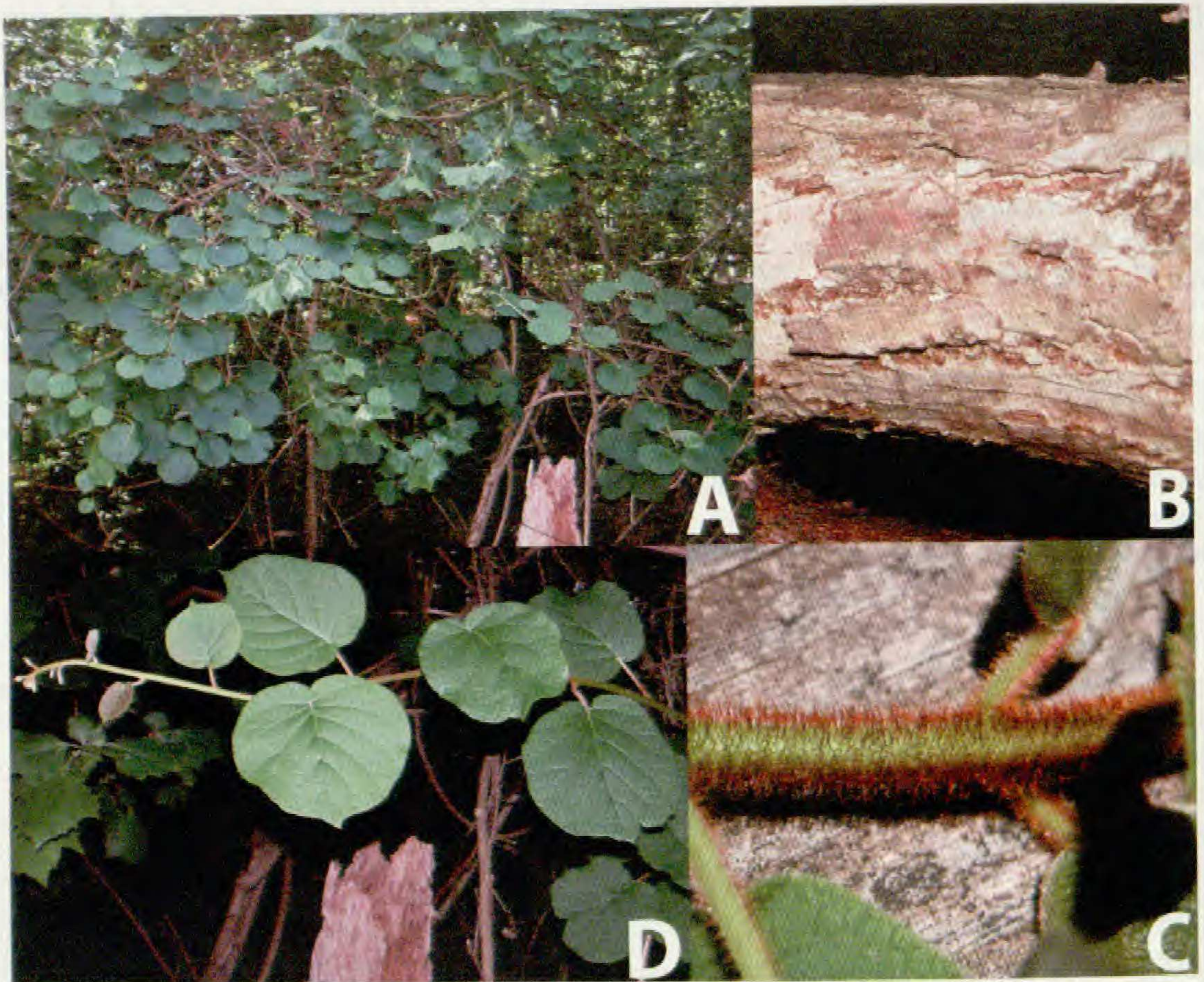


FIG. 1. Plant and habit of *A. chinensis* var. *deliciosa* (photographs are of spontaneous plant(s) from Saline County, Arkansas). A. Habit. B. Bark. C. Leaves and stem. D. Young stem and leaves showing dense indument of hispid trichomes.



FIG. 2. Herbarium specimens of *A. chinensis* var. *deliciosa* (specimens are from Saline County, Arkansas). A. Staminate flowers and leaves. B. Leaves and twining stem.

NEW SPECIES RECORD FOR THE CONTINENTAL UNITED STATES

Actinidia chinensis Planch. var. ***deliciosa*** (A. Chev.) A. Chev. (*A. deliciosa* (A. Chev.) Liang & Ferguson) (Actinidiaceae) (Fig. 1). Green kiwifruit is a large, deciduous liana that can climb by means of twining stems to a height of 10 meters or possibly more. It is native to China and Taiwan. *Actinidia chinensis* Planch. var. *deliciosa* is easy to distinguish from other vines in the eastern United States by the combination of the dense indument of large, red, reddish-brown, or whitish-tan, setose or hispid trichomes that cover the young stems and leaves, relatively thick, robust stems, and large (at maturity—up to 20 cm long), cordate-acuminate, pubescent, prominently-veined leaves. The large leaves and colorful new growth give the plant a tropical appearance. The voucher specimen below represents the first spontaneous record of *A. chinensis* var. *deliciosa* documented in the United States (Fig. 2).

Voucher specimen: ARKANSAS. Saline Co.: River Oak Drive, 1300 block, Benton, one or possibly two distinct clusters of stems, separated by about 2 m, remnant patch of mixed pine-hardwood, associates include *Callicarpa americana*, *Cornus florida*, *Fraxinus pennsylvanica*, *Liquidambar styraciflua*, *Pinus taeda*, *Platanus occidentalis*, *Quercus alba*, *Rhus copallina*, *Toxicodendron radicans*, and *Ulmus alata*, 5 May 2012, B. Serviss 7423 (HEND).

Two clusters of stems, separated by about 2–3 meters, were observed at the site, but it was not determined whether or not each was a separate plant or a single, interconnected system of stems and roots. Both clusters of stems were present as large, multi-trunked, reproductive-age, staminate (*A. chinensis* has bisexual flowers but is functionally dioecious) lianas, growing on a wooded slope and up into and through the canopy to edge of woods. The immediate location of the *A. chinensis* var. *deliciosa* plant(s), while bordered by streets and residential areas, appears to be relatively undisturbed, with no evidence of a prior home site or areas of cultivation observed. However, a sewer pump station with associated cleanout valves is present at the site, which offers a potential explanation as to route of introduction of the *Actinidia* plant(s), which were rooted in close proximity to the cleanout valves. Introduction via seed may have occurred during routine cleaning of the sewer lines, or possibly even during an overflow event; subsequent seed germination and development resulting in the spontaneous plant(s).

In addition to *A. chinensis* var. *deliciosa*, two other species of *Actinidia*: 1. *A. arguta* (Siebold & Zucc.) Planch. ex Miq. (hardy kiwi, tara vine) and 2. *A. polygama* (Siebold and Zucc.) Maxim. (silver vine) have been documented outside of cultivation in Ohio and the northeastern United States (NRCS 1999; Mitchell 2000; Wilder & McCombs 2002; Haines 2011). See below for key to identification of these species (for a detailed treatment of *Actinidia*, including *A. chinensis* and its three varieties, see Flora of China Editorial Committee 2007).

KEY TO SPECIES OF ACTINIDIA IN THE CONTINENTAL UNITED STATES

1. One- to two-year-old branches (branchlets) densely strigose- to hispid-pubescent; fruits variously hispid-pubescent _____ ***A. chinensis* var. *deliciosa***
1. One- to two-year-old branches (branchlets) glabrous, rarely finely tomentose-puberulent, but not strigose or hispid; fruits glabrous _____ ***A. polygama***
2. Pith of stems solid _____ ***A. arguta***
2. Pith of stems lamellate (made up of thin plates) _____ ***A. arguta***

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REFERENCES

- BELROSE INC. 2009. World kiwifruit review. Pullmam, WA. U.S.A.
- ESSL, F. AND O. STOEHR. 2006. Remarkable floristic records from Vienna, lower Austria, Burgenland, and Styria, part III. Linzer Biol. Beitr. 38:121–163.

- FERGUSON, A.R. 1999. New temperate fruits: *Actinidia chinensis* and *Actinidia deliciosa*. In: J. Janick, ed. Perspectives on new crops and new uses. American Society for Horticultural Science Press, Alexandria, Virginia. Pp. 342–347.
- FERGUSON, A.R. AND E.G. BOLLARD. 1990. Domestication of the kiwifruit. In: I.J. Warrington and G.C. Weston, eds. Kiwifruit science and management. Ray Richards Publisher in association with the New Zealand Soc. Hort. Sci. Auckland.
- FLORA OF CHINA EDITORIAL COMMITTEE. 2007. Flora of China. (Hippocastanaceae through Theaceae). Science Press, Beijing, China and Missouri Botanical Garden Press, St. Louis, MO. Vol. 12:334–364.
- HAINES, A. 2011. Flora Novae Angliae: a manual for the identification of native and naturalized higher vascular plants of New England. New England Wildflower Society. Yale University Press, New York and London.
- KASPEREK, G. 2004. Kiwifruit (*Actinidia deliciosa* Liang and Ferguson) occurring in the wild in western Germany. Florist. Rundbr. 37:11–18.
- MITCHELL, R.S. 2000. Silver vine, an Oriental kiwi berry, found escaping cultivation in Sterling Forest. N. Y. F. A. Newslett. 11:1–2.
- NEVES, S.S., A.S. WEAKLEY, AND P.B. COX. 2009. *Bupleurum gerardii* All. (Apiaceae), an addition to the North American flora, with comments on the treatment of aliens in floras. Castanea 74:424–433.
- PECK, J.H. AND B.E. SERVISS. 2011. *Neptunia oleracea* Lour. (Fabaceae) new to the continental United States, with new and noteworthy records of several angiosperms in Arkansas. J. Bot. Res. Inst. Texas 5:321–326.
- SERVISS, B.E. 2009. *Pyracantha koidzumii* (Rosaceae) new to the Arkansas flora. J. Bot. Res. Inst. Texas 3:319–321.
- USDA, NRCS. 2008. The PLANTS Database (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA. Accessed on 7 May 2012.
- WHITTEMORE, A.T. 2004. Sawtooth oak (*Quercus acutissima*, Fagaceae) in North America. Sida 21:447–454.
- WILDER, G.J. AND M.R. MCCOMBS. 2002. New records of vascular plants for Ohio and Cuyahoga County, Ohio. Rhodora 104:350–372.
- WUNDERLIN, R.P., B.F. HANSEN, A.R. FRANCK, K.A. BRADLEY, AND J.M. KUNZER. 2010. Plants new to Florida. J. Bot. Res. Inst. Texas 4:349–355.
- YATSKIEVYCH, G. AND J.A. RAVEILL. 2001. Notes on the increasing proportion of non-native angiosperms in the Missouri flora, with reports of three new genera for the state. Sida 19:701–709.